

ORIGINAL RESEARCH ARTICLE

A novel binder jetting-based process for metal-bonded diamond grinding wheels and its microstructure formation

Supplementary File

The porosity of infiltrated samples is highly sensitive to infiltration time: too short a time leaves voids unfilled by liquid bronze, while too long a time erodes the insufficiently sintered matrix, regenerating pores.

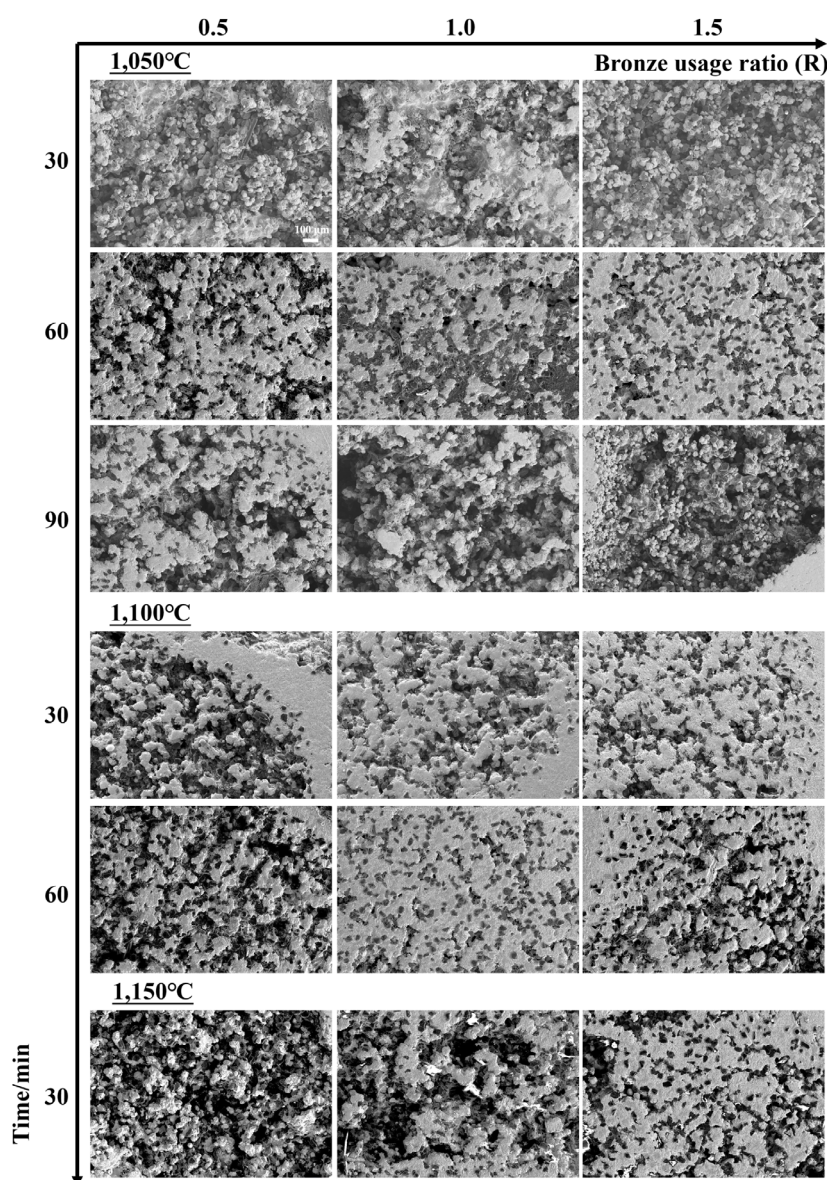


Figure S1. Effects of infiltration conditions on the samples' microstructure. Scale bar: 100 μm ; Magnification: 200 $\times$.

The elemental distribution in the abrasive region and lattice region, as well as their interface within the infiltrated samples are shown in [Figures S2 and S3](#).

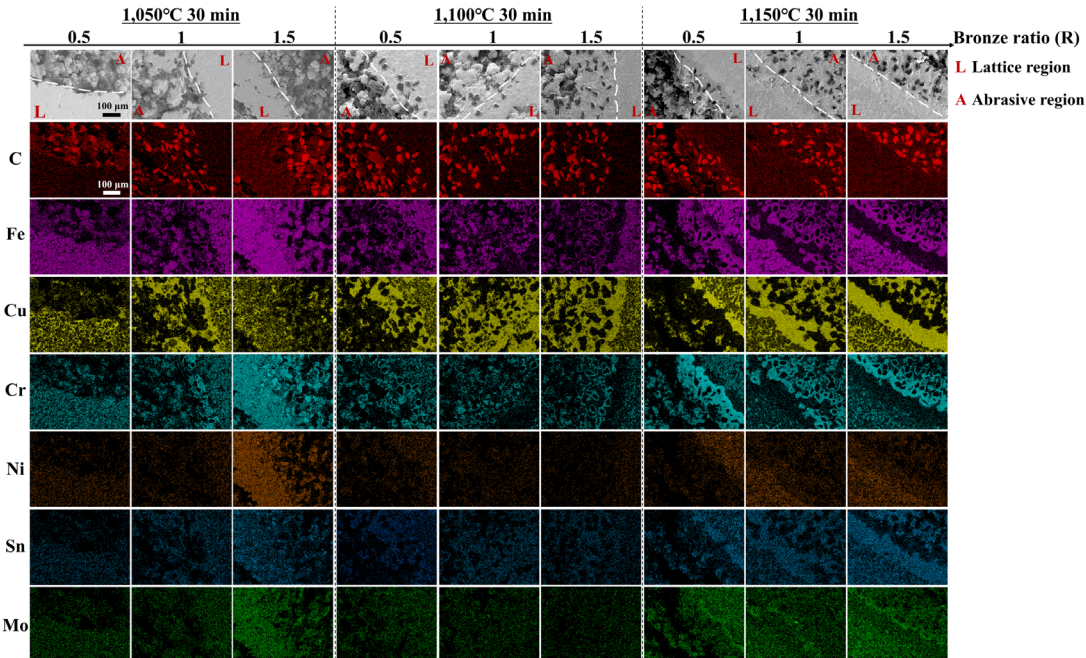


Figure S2. Elemental distribution in the interface of the infiltrated samples (part 1). Scale bar: 100 µm; Magnification: 500×. Abbreviations: C: Carbon; Cr: Chromium; Cu: Copper; Fe: Iron; Mo: Molybdenum; Ni: Nickel; Sn: Tin.

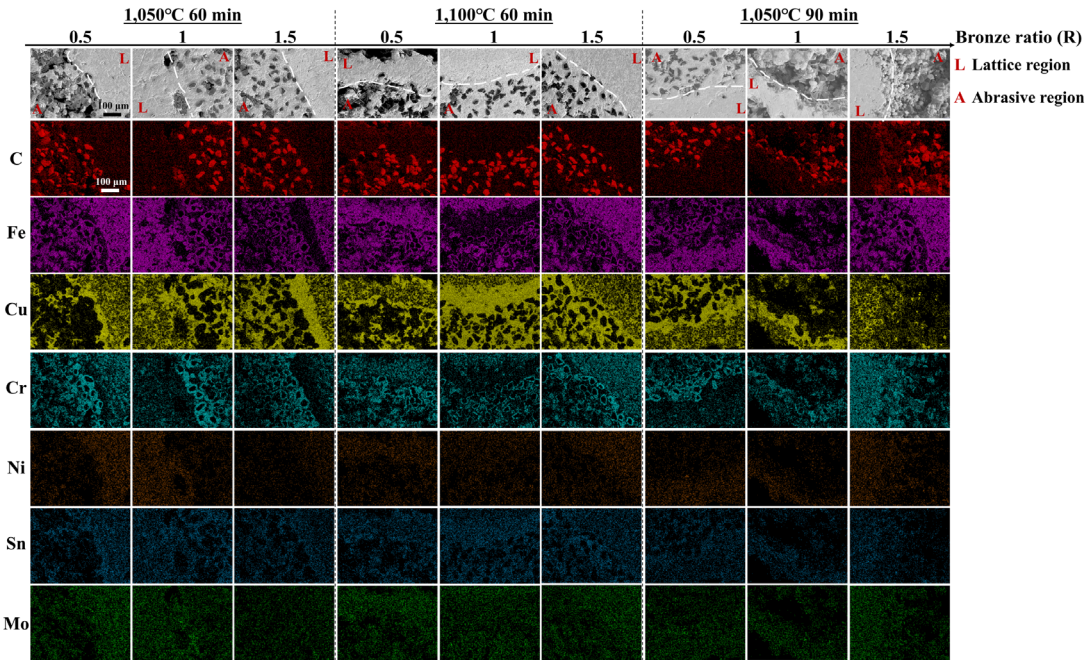


Figure S3. Elemental distribution in the interface of the infiltrated samples (part 2). Scale bar: 100 µm; Magnification: 500×. Abbreviations: C: Carbon; Cr: Chromium; Cu: Copper; Fe: Iron; Mo: Molybdenum; Ni: Nickel; Sn: Tin.

The energy-dispersive X-ray spectroscopy (EDS) mapping results for the region next to the diamond particle, the diamond grain shedding zone, and the lattice region in the infiltrated sample (1,100 °C, 1 h, R = 1).

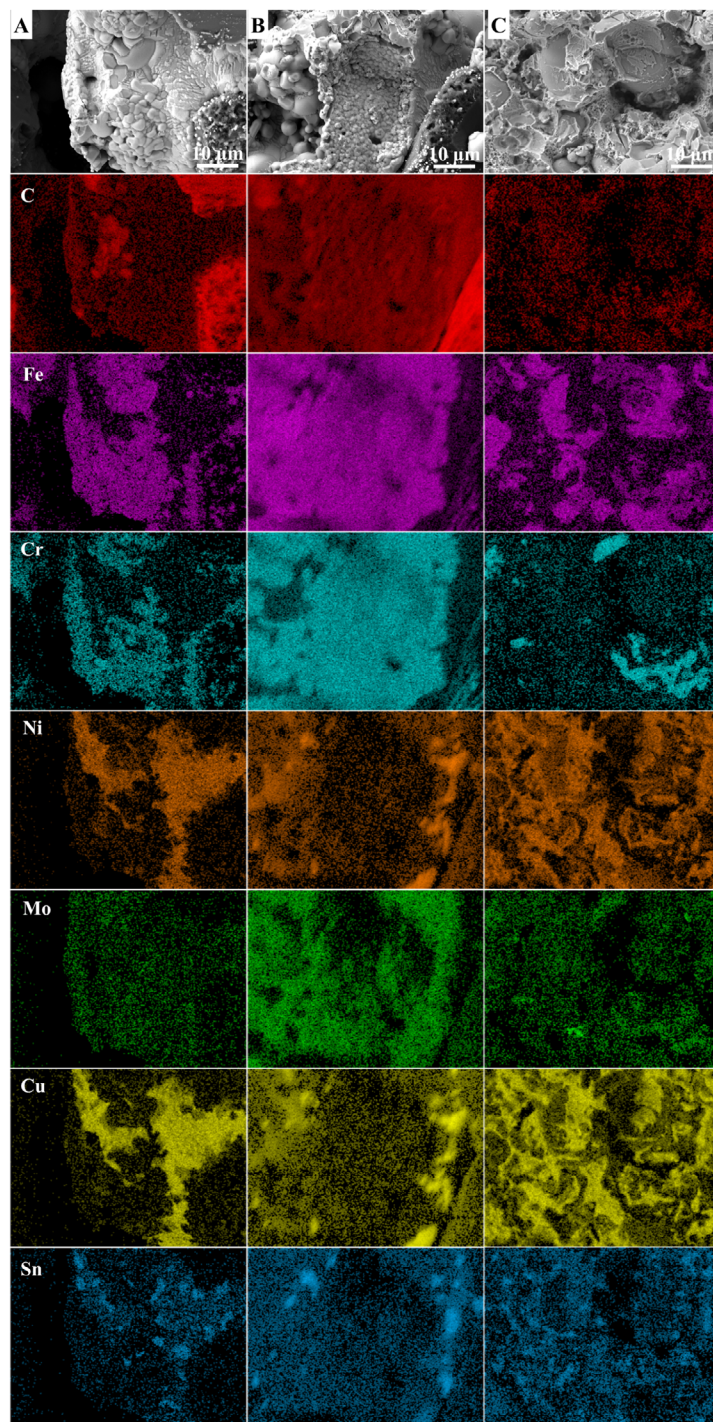


Figure S4. Full element distribution results in (a) region next to diamond particle, (b) diamond grain shedding zone, and (c) lattice region in the infiltrated sample (1100 °C, 1h, R=1). Scale bar: 10 μm; Magnification: 5,000×.

Abbreviations: C: Carbon; Cr: Chromium; Cu: Copper; Fe: Iron; Mo: Molybdenum; Ni: Nickel; Sn: Tin.

The EDS mapping of the lattice and abrasive regions of the fracture surfaces of the three-point bending test samples infiltrated at 1,100 °C, 1 h.

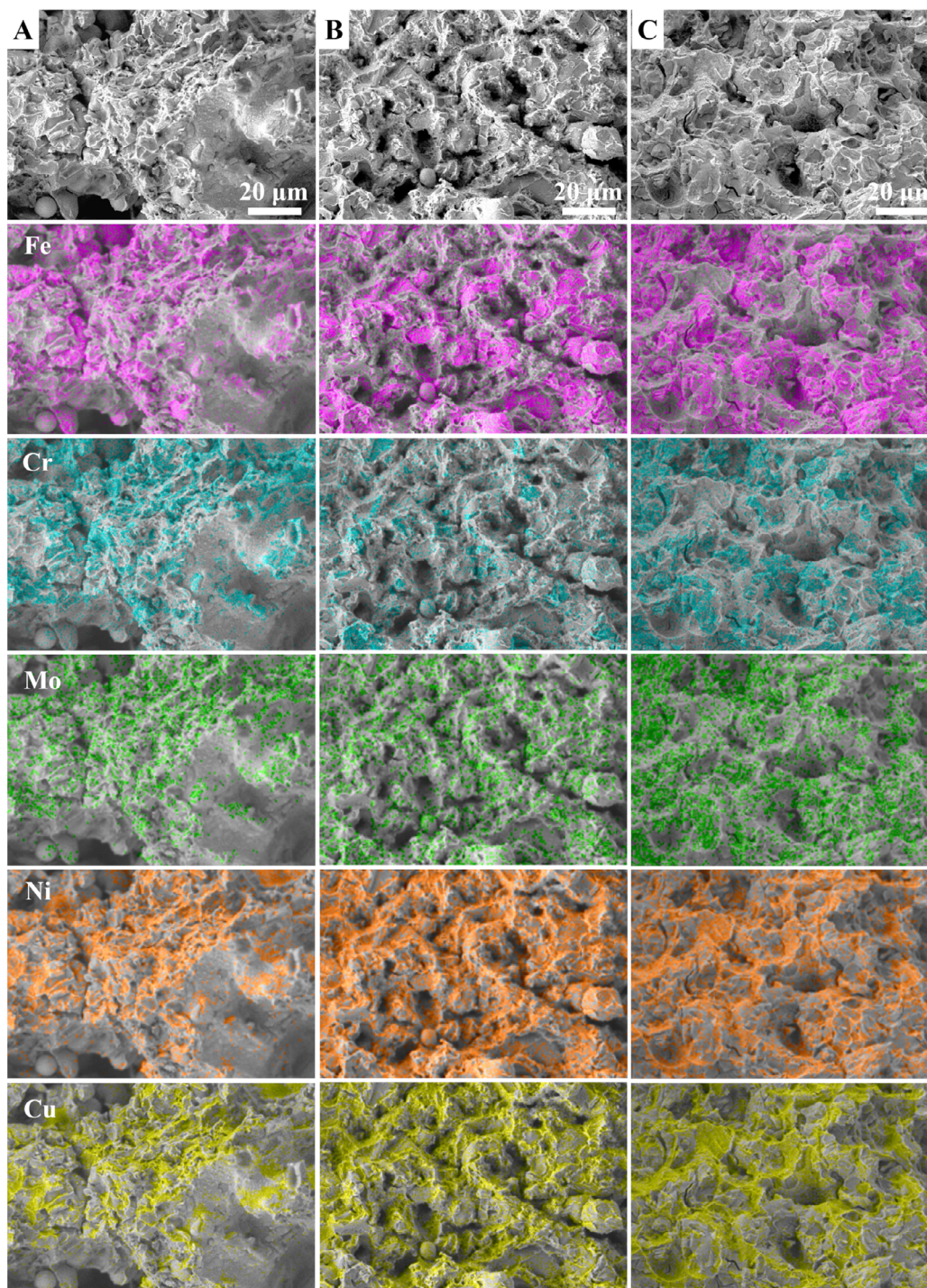


Figure S5. Full element distribution results of the lattice region. Scale bar: 20 μm ; Magnification: 500 $\times$. Abbreviations: C: Carbon; Cr: Chromium; Cu: Copper; Fe: Iron; Mo: Molybdenum; Ni: Nickel; Sn: Tin.

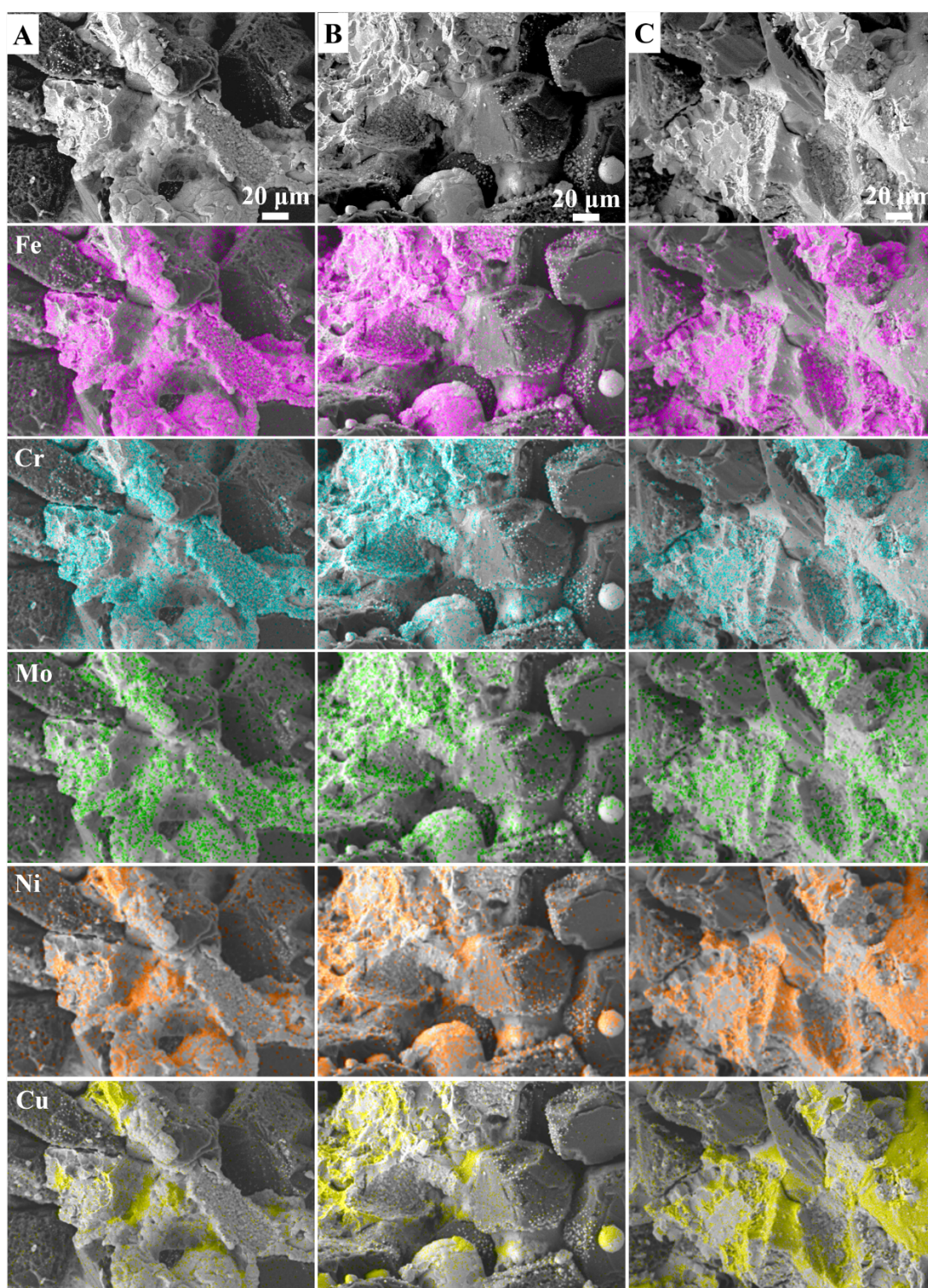


Figure S6. Full element distribution results of the abrasive region. Scale bar: 20 μm; Magnification: 500×. Abbreviations: C: Carbon; Cr: Chromium; Cu: Copper; Fe: Iron; Mo: Molybdenum; Ni: Nickel; Sn: Tin.